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REPORT NO.

COUNTRY Czechoslovakia

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SUBJECT 1. Production of Transmitters
2. Julius Fucik Plant, Tesla, National Enterprise, Prague - Hloubetin

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THIS IS UNEVALUATED INFORMATION

SOURCE

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History

1. Production of transmitters in Czechoslovakia started sometime in the years just prior to World War II (I do not know exactly when). Radioslavia, Ltd. in Prague-Vysocany was the only company engaged in this production. At that time the production was laboratory production only. The Radioslavia Enterprise was completely wiped out during the second bombing of Prague in 1944. The production of transmitters was resumed sometime in 1947 in a new Radioslavia factory, built in 1945 or 1946, in Prague-Vrsovice, SNB Avenue #55. The Radioslavia Firm was nationalized in 1948 and named Tesla Vrsovice, National Enterprise. The plant produced both transmitters and transmitter electronic tubes.[1] During a period of about three months at the end of 1950 and the beginning of 1951, transmitter production was transferred to the installations of the Tesla Hloubetin #II, National Enterprise, in Prague IX, Hloubetin, Podebradska #186, which were available because the production of receiver electronic tubes was transferred during 1950 from Hloubetin to Roznov pod Radhostem [2] N 49-28, E 18-087 [2]. and the Tesla Hloubetin II was liquidated.

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2. Located in the same installations with the Tesla Hloubetin II Plant was Tesla Hloubetin I, National Enterprise, whose main production was radio receivers. Radio receivers were produced in the Tesla Hloubetin I plant on three production lines; two of them were under full operation and the third in partial operation. The two lines produced four radio receivers per hour apiece; the third, two receivers per hour which meant that on a 48 hour week basis, production reached about 24,000 units a year. The plant produced practically all the receiver parts as well as assembled them. /See Enclosures A and B for plant layout./

3. Starting in 1949 the production of radio receivers decreased at Tesla Hloubetin I until it ceased completely at the end of 1951. After the production of receiver tubes was transferred to Roznov pod Radhostem, the Tesla Hloubetin I Enterprise (including the buildings of Tesla Hloubetin II) was renamed Tesla, National Enterprise, Julius Fucik Works. The major part of the radio receiver production equipment remained in the plant and was used for the production of transmitters. Some special radio receiver production equipment was transferred, I believe, to the Tesla Lanskroun, National Enterprise, in Lanskroun /N 49-55, E 16-37/. It was rumored that as the production of radio receivers decreased a small production of various telecommunications equipment was transferred there from other Tesla plants because there was a lack of production facilities in the other plants at that time. Tesla Strasnice, National Enterprise, Josef Haken Works, in Prague-Strasnice #800, was the main Tesla plant for the production of telecommunications equipment and handled, for the most part, military contracts. This enterprise had several production buildings in the Prague vicinity; I do not know exactly where. Further, Tesla Karlin, National Enterprise, in Prague-Karlin, Sokolovska #84 (formerly the Siemens Firm), and Tesla Karlin, National Enterprise, plant in Karlin-Pobrezni, located in Prague-Karlin, Pobrezni Street #46, were also engaged in the production of telecommunications equipment. However, I would say that the Josef Haken Works produced telecommunications equipment of recent design, while the other two Tesla plants produced mostly standard telecommunications equipment.

4. I do not know if the production of telecommunications equipment continued at the Julius Fucik Works after the production of receivers came to a halt, but it is my opinion that it did not because the transfer of the production of telecommunications equipment from other Tesla plants to this plant was supposed to be temporary. The production of transmitters in the Julius Fucik Works, in the first quarter of 1951, was under the Tesla Vrsovice Plant. In the second quarter of 1951 it was incorporated into the Julius Fucik Works. The management of the Julius Fucik Works succeeded in persuading the authorities that since transmitters were produced in their plant, it should not be liquidated merely because it was no longer producing radio receivers. Tesla National Enterprise, Julius Fucik Works, was the only enterprise in Czechoslovakia producing transmitters for broadcast and purposes other than purely military or telecommunications. I do not know where military transmitters were produced. As far as telecommunication transmitters are concerned, their production was mainly in the Josef Haken Works, Prague-Strasnice, mentioned above.

Production

5. From 1947 until the end of 1951 the Czechoslovak transmitter production was only piece production. The preparations for production in series began in 1951 and the actual series production started in 1952. The production was, from its inception, headed by Ing. KLIKA, chief transmitter designer, about 45 years old, an electrical engineer, who was not a CP member but gave the impression he cooperated fully with the regime. KLIKA was one of the first technicians of the former Radioslavia Firm and

gained his experience at the Marconi Firm in London. He had for years worked with VACKAR, design specifications chief. VACKAR was not a CP member either but collaborated fully with the regime.

6. Below are listed the most important transmitters which were built in Czechoslovakia between 1947 and 1951. (It is possible that some other, secondary, transmitters were built in this period.)

a. The medium-wave transmitter, located in Velke Kostolany /N 48-30, E 17-43/ had a capacity of about 150 kw., and was built in 1947 or 1948. The CAT-14C was used as the main transmitter tube and the CAR-6 was used in the rectifier.

b. The Velke Kostolany short-wave transmitter (capacity 120 kw.) was built in 1948. The CAT-17C was used as the main transmitter tube and the CAR-6 in the rectifier.

c. The Warsaw middle-wave transmitter, capacity 150 kw., was built in 1949 or 1950. The CAT-14 was used as the main transmitter tube; the GT-15 in the rectifier.

d. The Ceskoslovensko long-wave transmitter, located in Topolona /N 49-07, E 17-34/, had a capacity of 180 kw., but its output was only 150 kw. The CAT-14 was the main transmitter tube; the CAR-6 was used in the rectifier. This transmitter was built in 1951 and the first quarter of 1952 and was put into operation in the second quarter of 1952. This transmitter broadcasted on 1190 meters.

e. The Karlovy Vary and Pilsen-Kosutka transmitters (probably short-wave) each had a capacity of about 25 kw. The ACT-16 was used as the modulation tube (two units) and the oscillator tube (one unit). The rectifier was probably equipped with the GU-11 tube. These transmitters were built in the second half of 1950 and the first half of 1951 and installed in the last half of 1951. I heard that the Pilsen-Kosutka transmitter was installed in a wooden construction that resulted in decreasing the life of the tubes. (It was common knowledge among the technicians in the plant that these transmitters were used as jamming transmitters. The tubes were not tested as carefully as they should have been if destined for ordinary broadcast transmitters and these tubes were produced hurriedly.)

f. The Prestice /N 49-34, E 30-19/ transmitter, probably middle-wave, had a capacity of about 50 kw. The tube used was probably the CAT-9. This transmitter was built during 1950 and it is probably used as a jamming transmitter for the RFE broadcast on 417.2 meters. (I believe that this transmitter was used for jamming because I do not know of any other middle-wave transmitter which might have been built for this purpose and because the jamming of the RFE broadcasts on middle-wave started about the same time as this transmitter would have been finished.)

g. The Podebrady /N 50-09, E 15-08/ transmitters (I believe that there were two: a middle-wave, 40 kw. capacity transmitter, as well as a short-wave, 30 kw. capacity transmitter) were probably Czechoslovak products also.

h. Small broadcast transmitters were built from time to time both for the army and Czechoslovak Broadcast. Those for Czechoslovak Broadcast had about 10 kw. capacity and were probably used as jamming transmitters. I do not know the use of the army transmitters. A transmitter which had a capacity of 40 kw. was turned over to the army at the end of 1950. (I believe that these transmitters were used for jamming because jamming was performed in Czechoslovakia before the transmitters mentioned above /paragraph 6, f/ were put in

operation and because the transmitters were of a relatively low power which would be unusual for normal broadcasting.)

7. During 1952 and 1953 small transmitters, up to 50 kw. capacity, were produced in small series, and both small and large transmitters, with capacities 50 kw. and higher, were produced in piece production.

a. Series production consisted of short-wave transmitters, 25 kw. capacity, and also, (rarely however), middle-wave transmitters of 30 kw. Both types used the ACT-16 tube (two tubes as oscillator and one tube as modulator). Probably these transmitters were similar to the Karlovy Vary and the Pilsen-Kosutka transmitters. Only about five units of both types were produced in 1952 and about 20 units in 1953. I believe that a total of 40 of these transmitters will be produced in 1954. (The technicians involved in the production believed that these transmitters were used for jamming because they were very similar to those mentioned above /paragraph 6, f/, and because they were produced in a series, which was not usual for normal broadcast transmitters.)

b. The piece production was as follows:

(1) Middle-wave transmitter of about 60 kw. capacity and a short-wave transmitter of about 50 kw. capacity, with the shortest wave being about 20 meters, using the ACT-201 tube. Most probably one unit was produced in 1952 and two units in 1953. (I believe that this type of transmitter was used for jamming because the tubes were not tested as carefully as they should have been for use in normal broadcast transmitters and they were produced very quickly.)

(2) Middle-wave transmitter of 10 kw. capacity, which used the ACT-14 tube. Two units were built in 1953. There were no units produced in 1952.

(3) Short-wave transmitter, 12 kw. capacity, which used the CAT-6K tube. Two units were produced in 1953; no units were produced in 1952.

(4) Middle-wave transmitter of 15 kw. capacity which used the CAT-6 tube. Two or three units were produced in 1952 and none in 1953. (I believe this type transmitter and those mentioned above /paragraph 7 b, 2,3/ were used for jamming purposes because this was the opinion among the technicians involved; these transmitters were of a relatively low power which was unusual for normal broadcast transmitters.)

(5) Middle-wave transmitter of 100 kw. capacity and a short-wave transmitter of 80 kw. capacity, with the shortest broadcast wave being 20 meters, using the CAT-201 as the main tube. These were used as normal broadcast transmitters. One unit was produced in 1952 and two units in 1953.

(6) Middle-wave transmitter of 100 kw. capacity with the CAT-14C as the main tube. One unit was produced in 1953 for normal broadcast purposes.

(7) Short-wave transmitter of 120 kw. capacity, with the CAT-17C as the main tube. One was produced in 1952 and one in 1953; both were used as normal broadcast transmitters.

(8) Television broadcast transmitter, the first and only one in Czechoslovakia, was produced in 1952 and installed in 1953 on Petrin Hill.

(It is probable that some of the transmitters above /under sub-paragraphs 5, 6, and 7/ were exported.) I believe that the piece production will slightly increase during 1954.

8. Not all the parts were produced by the plant where the transmitters were assembled; some were produced in various other plants. The following parts were produced by the assembly plant (either Tesla Vrsovice or Julius Fucik):

a. Induction coils of various design and size were produced from copper tubing and sometimes from copper bands. The tubing was silver-plated when the coils were used for oscillators.

b. Tuning condensers, both rotary air condensers and rotary oil condensers, were made mainly from copper.

c. Ohm resistors, of the mesh type (wound from resistor wires and from asbestos cord) were rectangular in shape. Other unusual types such as cylinder-shape, plate-shape, and spiral-shape were also made.

d. Insulating parts, such as plates, various connecting parts and various supporting parts, were made for the most part from Micalex. /See paragraph 10, f./

e. Frames for transmitters were mainly of profiled iron and covered with sheet metal.

f. Cooling equipment was manufactured for both water and air-cooled tubes.

g. Auxiliary assembly parts of various material and for various purposes were also made.

h. Transformers with movable cores which acted as voltage control (transformers with inductance) were used for heating high-power transmitter tubes. 3.

9. Parts which were not produced by Tesla Vrsovice or Julius Fucik Works were as follows:

a. Transformers: (All the transformers used in the production of transmitters were Czechoslovak products and most of them were supplied by Janka, National Enterprise, Prague.)

(1) Transformers, both oil and air, (mainly three-phase transformers for anode voltage rectifiers) with a capacity of 250, 200, 150, 100, 70, 50, 30, 20 and 10 kva., for a voltage of 30, 25, 20, 15, 7, 5, 3, 2, and 1 kv.;

(2) Heating transformers (220V/20 or 30 v. heating voltage), used for heating transmitter tubes, usually had one-phase and were naturally air cooled. They were of various capacities such as, 3, 2, 1, 0.5 kva.;

(3) Other transformers of various design for various purposes.

b. Inductances (chokes, voltage controls), mainly for rectifiers, were oil or air inductances. The oil type were for high-power anode rectifiers and the air inductances were for various smaller power rectifiers. The inductances were Czechoslovak products and were usually supplied by Janka, National Enterprise, Prague.

c. Condensers:

(1) These were oil fixed condensers with a large capacity for higher voltage. They were Czechoslovak products.

(2) Oil variable condensers of larger capacity, mainly rotary condensers, were imported, probably from Eastern Germany.

(3) Air fixed condensers were ceramic condensers, plate-shaped /Enclosure C, b/ (10, 15, 20 cm. in diameter), or plug-shaped /Enclosure C, a/.

(4) Ceramic condensers were for high voltage (1, 3, 5 kv.) and were imported from Eastern Germany.

(5) Air fixed condensers, box-shaped, were Czechoslovak products and were made according to the NT standards (Tesla standards). They were for low voltage.

d. Resistors:

(1) Ceramic resistors (for higher watt load) were imported from Eastern Germany.

(2) Wire resistors made of wire of different sizes, wound on an insulating plate, were a Czechoslovak product. There were NT standards for wire resistors of smaller sizes.

e. Water resistors were used for water-cooled transmitter tubes to prevent direct connection between the anode, which was at high voltage, and the ground. Therefore the water, before it entered and after it left the anode, ran five meters (a total of 10 m.) through an insulating milieu. This insulator was usually a ceramic disc with spiral tubing or a ceramic plate with lateral tubing. /See Enclosure D, a and b./ The disc resistors were imported from England and the plate resistors were also imported, I believe, originally from Switzerland and later from East Germany.

f. Insulators of various kinds and various shapes for high voltage, e.g., supporting insulators for connecting parts to the anode (used with water-cooled tubes) or tubing insulators with wavy surface for air-cooled transmitter tubes; insulators of high voltage conductors and insulators of low voltage conductors, and others, were made in Czechoslovakia. I do not know what firm produced them.

g. Electric panel measuring instruments, mainly ammeters and voltmeters of various sizes were supplied primarily by Metra, National Enterprise, in Blansko /N 49-22, E 16-40/.

h. Monitors were used for control equipment for disconnecting an electrically controlled circuit. There were water monitors for controlling the water stream of water-cooled electronic tubes and air monitors for controlling air current of air-cooled tubes. I do not know who the supplier was but I know that Regula, National Enterprise, in Prague-Vrsovice dealt with this type of production.

i. Sleeves for lower power electronic tubes, such as GU-11, GU-14, RD-200/3.5 were of Czechoslovak origin but I do not know where they were produced.

j. Signal electric bulbs and sleeves for them were Czechoslovak products, but the factories involved are unknown to me.

k. Switches(which were set into position by an electric magnetic field) were oil switches of three poles for high voltage. They were produced by the Skoda, CKD, and MEZ plants. Oil switches, of three poles for low voltage, were produced by the Srb Company in Modrany /N 50-01, E 14-25/. I believe this plant is presently a CKD plant. Air switches, three pole and one pole for low voltage, 40, 25, 10 amp., were probably supplied also by the Modrany factory and by some other domestic suppliers.

l. Switches and voltage change-overs of various design and various sizes were of one or three poles. All of them were domestically produced.

m. Push switches, so-called "start-stop", which were used for switching on controlling circuits, were used for remote control of switches mentioned above /paragraph k/. They were domestic products.

n. Auto-transformers had only one winding which was both for primary and secondary winding. These auto-transformers were of Czechoslovak production but I do not know the plants involved.

(1) Adjustable auto-transformers, column-shaped, three phase, had movable contacts.

(2) Circular auto-transformers, one phase, so-called "Variak type" were used for control of normal net voltage.

o. Induction regulators (boosters) were used as transformers to control net voltage for rectifiers and other purposes. They looked like an electric motor. They were produced by Skoda, CKD, and MEZ.

p. Three-phase electric motors of various sizes were used for various purposes, for instance, to drive ventilators of air cooled tubes or to control contactors, boosters, etc. They were Skoda, CKD, or MEZ products.

q. Motor Generators (actually, direct current dynamos connected with a fix clutch to a three-phase electric motor) were used for heating high power transmitter tubes. There had been efforts in recent years to replace these motor generators with transformers with movable cores for voltage control /paragraph 8, h, this report/. 3. They were supplied by Skoda or CKD.

10. Materials supplied to the plant (either Tesla-Vrsovice or Julius Fucik Works) for production of parts included the following:

a. Copper tubing, copper bands, copper wires, copper sheets, and copper cables came from domestic sources. This material was used for the production of various induction coils, tuning condensors, other parts of the transmitter, and finally as a current conductor for "nn", "vn", and for "mn" voltage. (According to the CSN/ESC standards 4. "mn" voltage was up to 50 v. against the ground; "nn" was up to 300 v.; "vn" up to 33,000 v.; and "vvn" above 33,000 v.)

b. Aluminum rods, sheets, wire, and bars were used as a substitute for copper. (Before 1951 aluminum was used frequently as a substitute for copper but during 1951 the Tesla Vrsovice plant issued instructions that because of the shortage, aluminum was as important a strategic material as copper, and therefore it was to be used as a substitute for copper only when necessary. During 1952 the production of so-called "aluminum paint" was prohibited.)

c. Brass, mainly bars and sheets, was used for various parts like shafts, screws, and other connecting parts and was of domestic production.

d. Iron, so-called "construction steel", was profiled material in shapes such as ⌐, ⊔, ⊤, [, or sheets, bars, and tubing. This material was used for the production of transmitter frames. It was of domestic origin.

e. Resistance material for the production of ohm resistors /paragraph 8, c/. This material was delivered to the factory in the form of wire and bands. Originally it was procured only from abroad but later on from domestic sources as well.

f. Insulating material:

(1) Micalex (mica plus substances which I do not know sealed under pressure with ceramic powders used as a filler) was a high-frequency insulation material. It was imported but I do not know from where. Trial production was initiated in the Tesla Vrsovice plant but as of early 1953, the quality was only about 75% of that of the imported material. The domestic product had higher dielectric losses (tgs - power factor).

(2) Pressed cardboard was used mainly as insulating material for low-voltage parts which were not placed in the high-frequency field. This material was of domestic production.

(3) Insulating linen and insulating paper were made domestically.

(4) Rubber hose was of domestic origin.

(5) Asbestos insulating materials such as cords, tissue, bands, etc., were of domestic origin.

(6) Oil, used as a lubricant for transformers and condensers, was of domestic origin.

(7) Conducting material, of domestic production, including various water-conducting material (tubes and fittings) and various electricity conductors.

11. There was the usual production assembly equipment in the plant, such as lathes, drills, etc. There was no special production equipment for transmitter production. Most of the equipment dated from before World War II, although some was installed during the occupation and a small part was post-war. The technical laboratories were equipped with the necessary measuring instruments. There were about 10 laboratory voltmeters, about 10 ammeters, about 5 wattmeters, about 5 ohmmeters, and 2 bridges for measuring ohmic resistance. Further, there were two bridges for measuring capacity, two bridges for measuring induction, and

25X1A [redacted]

one bridge for measuring dielectrical losses. There were also two to four electronic oscillographs imported from various foreign countries. (Oscillographs were produced in Czechoslovakia by Krizik, National Enterprise, in Prague. The first Czechoslovak products appeared on the market in 1953 but I know nothing of their quality.) Similar measuring instruments were also in the control department; only two oscillographs were there. There were only standard measuring instruments in the shops.

12. The plant had the same departments and sections as specified for a Czechoslovak industrial national enterprise. At the end of 1950, after it was transferred to the Julius Fucik Works, the transmitter production had about 60 employees. The number increased to some 100 employees because some of the employees of the Julius Fucik Works radio receiver department were transferred to transmitter production. The plant, as a whole, had about 150 employees in 1952 and about 300 employees in 1953. I believe that the number of employees will increase in 1954 according to the increased production of the transmitters. Va clav CERNY, about 45 years old, was general manager. He was a former mechanic in the plant who became, after 1945, the chairman of the plant's council and became general manager in late 1948. He was a convinced and dangerous Communist and had rude manners.

Enclosures:

A. Plant Layout of the Julius Fucik Works

B. Playl Buildings of the Julius Fucik Works

C. Sketch Showing Plug-shaped and Plate-shaped Condensers

D. Sketch Showing Disc-shaped and Plate-shaped Resistors

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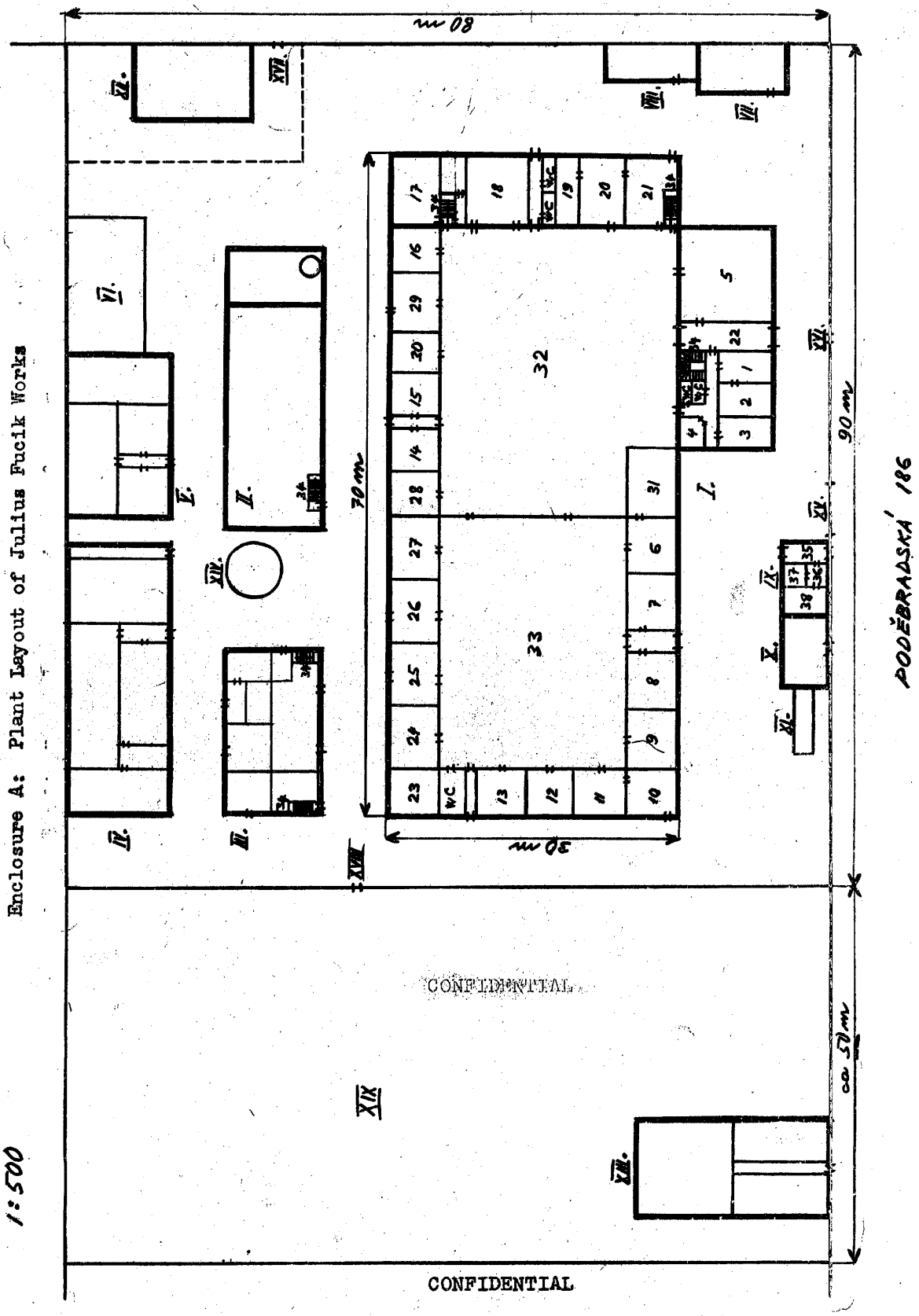
25X1A



Enclosure A: Plant Layout of Julius Fucik Works

25X1A

Enclosure A: Plant Layout of the Julius Fucik Works

LEGEND

I. Main Production Building: combination one and two-story brick building

1, 2 . General Manager and Secretariat

3 . Plant Council

4 -20. Administration offices, technical offices, and auxiliary shops

21. Storage of materials

22. Corridor

23-28. Auxiliary production shops

29. Main control room

30-31. Unknown to Source

32-33. Transmitter production area. The possible production of telecommunications equipment as mentioned in the report above would be located in a part of the Hall #33.

34. Stairways

II. Building: two-story; brick; with connecting boiler rooms. Source did not know its purpose.

III. Building: two-story; brick; one floor was the dispensary and materials storage room and on the second floor were the kitchen and mess hall.

IV.
V. } Buildings: one-story; contained auxiliary production, and storage of maintenance materials, etc.

VI. Warehouse: wooden

VII.
VIII. } Warehouses

IX. Gatekeeper's House

35. Entry for employees

36. Guard post

37. Visitors' room

38. Guard room

X. Grocery: (did not belong to the plant)

XI. Bicycle Parking

25X1A [redacted]

LEGEND to Enclosure A (Cont'd)

XII. House: for plant manager (there were two apartments in this house).

XIII. Apprentice Shop: wooden barrack-type building

XIV. Gas Reservoir

XV. Main Gate

XVI. Main Entrance: usually locked

XVII. Entrance: for house, /Pt. XII/

XVIII. Entrance: to open area

XIX. Open Area

XX. Research Institute: for vacuum technique and technology of parts (Podebradska Street #184) [redacted]

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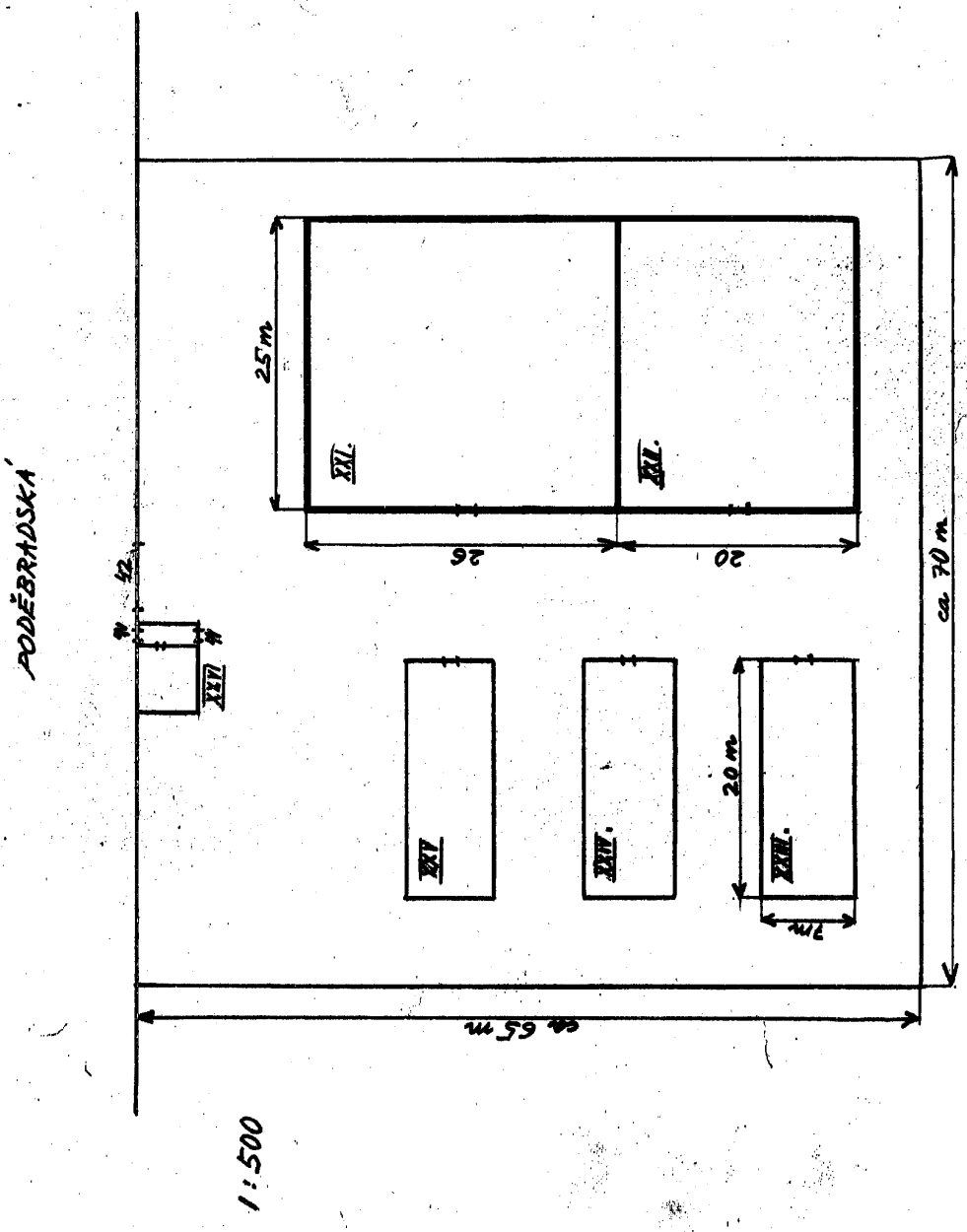
Enclosure B. Playl Buildings of the Julius Fucik Works



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Enclosure B: Playl Buildings of the Julius Fucik Works

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Source believed that this area, which was almost directly across from the main area of the Podebradska Plant, was acquired some time during World War II and made a part of the, plant now named Julius Fucik Works, because of lack of space in the plant's main area on Podebradska Street, #186.

XXI. Main Production Building: three floors, brick; production of radio-receiver parts such as coils, cooling condensers, reproducers.

XXII. Building: three-stories; brick; partially completed; used as storage warehouse.

XXIII.
XXIV.
XXV. } Barracks: wooden, one floor; used as warehouses for materials not in current demand.

XXVI. Doorkeeper's House

41. Entry: for personnel

42. Vehicle Gate

The buildings were used as given above before 1950, during the time the Julius Fucik Works produced radio receivers. Source did not know what these buildings were used for later; he believed, however, that if the Julius Fucik Works is engaged in the production of telecommunication equipment (as mentioned in the text), then a part of this production may be located in buildings XXI and XXII. Further, Source believes that before 1950 the Purchasing Department was located in building XXII. He did not know whether or not the Purchasing Department of the Julius Fucik Works was located there.

25X1A

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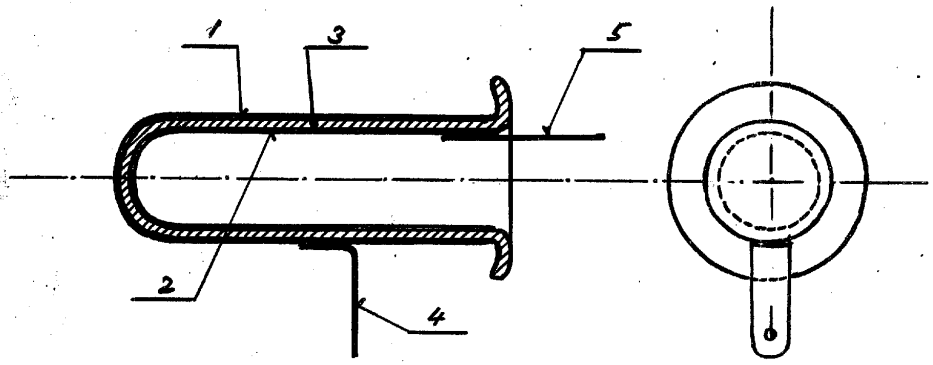
Enclosure C: Sketch Showing Plug-shaped and Plate-shaped Condensers

a. Plug-shaped Condenser



b. Plate-shaped Condenser

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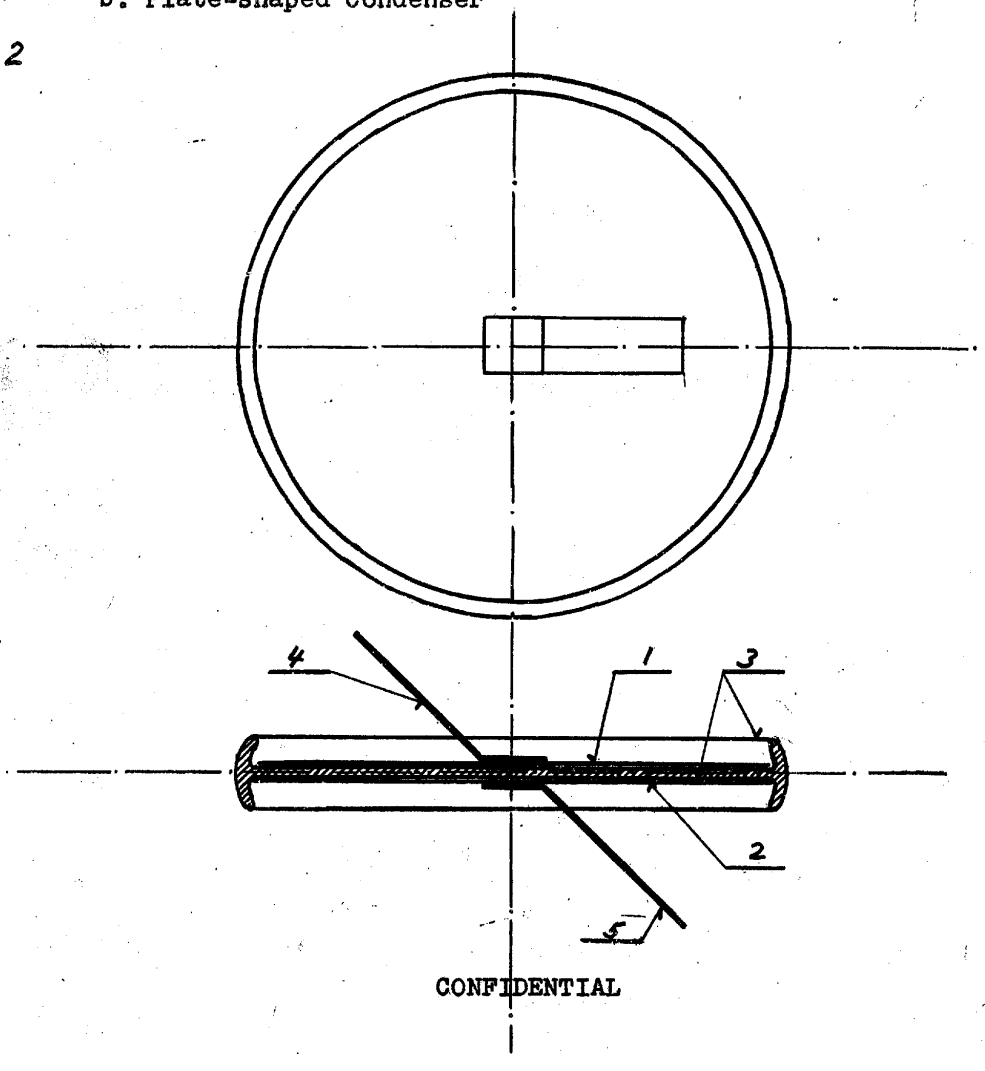


25X1A

Enclosure C: Sketch Showing Plug-shaped and Plate-shaped Condensers

LEGEND

a. Plug-shaped condenser

b. Plate-shaped condenser

1.
2. } Walls of the condenser, usually silver-plated.

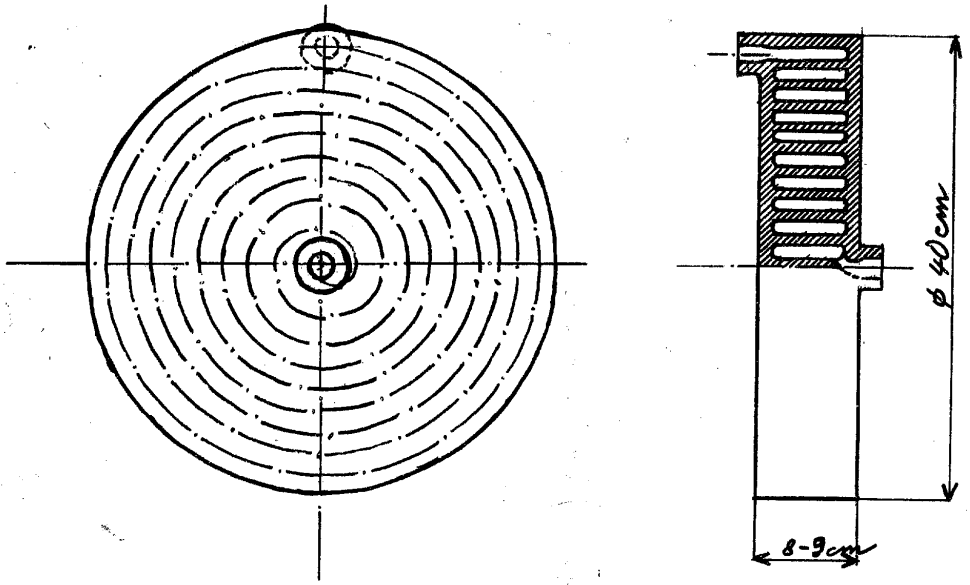
3. Ceramic

4.
5. } Input leads

 25X1A

Enclosure D: Sketch Showing Disc-shaped and Plate-shaped Resistors

a. Disc-shaped Resistor



b. Plate-shaped Resistor